

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-206755

(43)Date of publication of application : 28.07.2000

(51)Int.Cl.

G03G 15/01  
G03G 15/00  
G03G 15/08  
G03G 21/10

(21)Application number : 11-005092

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(22)Date of filing : 12.01.1999

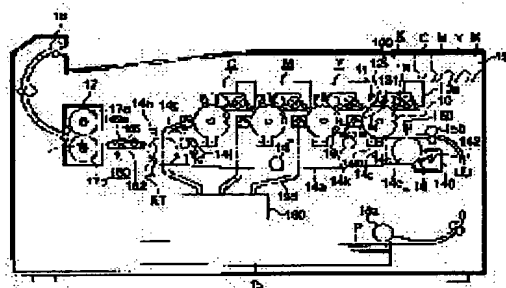
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## (54) COLOR IMAGE FORMING DEVICE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To recycle black color toner that has the highest frequency of use by carrying out recycling of the toner by installing the image forming unit of the black color in the most upstream position in the direction of rotation of an intermediate transfer body and carrying out recycling of the toner and at the same time, installing the image forming units of yellow, magenta, and cyan in downstream positions.

**SOLUTION:** In this color image forming device, the toner remaining inside a cleaning device 19 of the black color (K) image forming unit 100 installed most upstream in the rotating direction of the intermediate transfer belt 14a is ejected by a screw 19c from the cleaning device 19, carried to a developing device 13 of the black color (K) again through a carrying pipe 19d and recycled. The toner inside the cleaning device 19 provided for each image forming unit 100 for yellow(Y), magenta(M), and cyan(C) are ejected from the cleaning device 19 by the screw 19c, carried to a toner recovering container 190 through carrying pipes 19d and recovered to within the toner recovering container 190.



## LEGAL STATUS

[Date of request for examination]

05.06.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the  
examiner's decision of rejection or application converted  
registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of  
rejection][Date of requesting appeal against examiner's decision of  
rejection]

[Date of extinction of right]

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CLAIMS

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[Claim(s)]

[Claim 1] In color picture formation equipment which lays a toner image which has yellow, a Magenta, cyanogen, and each black image formation unit, and was formed of said each image formation unit one by one on top of belt-like a middle imprint object or imprint material Color picture formation equipment characterized by arranging yellow, a Magenta, and an image formation unit of cyanogen in a down-stream location, and collecting toners while arranging a black image formation unit in a hand-of-cut maximum upstream location of said middle imprint object and recycling a toner.

[Claim 2] It has yellow, a Magenta, cyanogen, and each black image formation unit. In color picture formation equipment established with a fixing means in an account toner image of back to front which laid a toner image formed of said each image formation unit one by one on top of belt-like a middle imprint object or imprint material Color picture formation equipment characterized by changing a location of an imprint material guidance means to said fixing means, or said fixing means into yellow, a Magenta, and an image formation unit of cyanogen with migration of said middle imprint object contact or whose alienation was enabled at the time of image formation by black toner.

[Claim 3] Color picture formation equipment according to claim 1 or 2 characterized by forming a double-sided image in said imprint material through said middle imprint object.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the color picture formation equipment of the electrophotography method which is made to pile up each other's color toner image formed on two or more image support, and forms a color picture.

[0002]

[Description of the Prior Art] It sets to a double-sided copy conventionally, and the image and the timing which imprinted the image of a field on imprint material, was established, once contained this to double-sided reversal feeding equipment, and was again formed on image support double, it feeds with imprint material from double-sided reversal feeding equipment, and the method which imprints the image of the field of another side and is established on imprint material is taken. [ it was formed on image support ]

[0003] Since conveyance of imprint material, such as letting the feed and anchorage device to double-sided reversal feeding equipment pass twice like the above, was performed, this double-sided copy equipment had the low reliability of imprint material conveyance, and had become the cause which causes a jam etc. By JP,49-37538,B, JP,54-28740,B, JP,1-44457,A, JP,4-214576,A, etc., on the other hand, after forming a toner image in both sides of imprint material, What is established at once is proposed. To JP,1-44457,A or JP,4-214576,A, especially Image support, The image formation means which consists of an electrification means, an image exposure means, a development means, a cleaning means, etc. is arranged to juxtaposition on two or more set middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K), and the method of forming the double-sided copy of a color picture is proposed.

[0004]

[Problem(s) to be Solved by the Invention] However, the double-sided color picture formation by the above-mentioned proposal Arrange many image formation means around a belt-like middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K), and on a belt-like middle imprint object, one color, although image formation is performed in piles, a color toner image at a time The toner on a middle imprint object carries out a re-imprint (adhesion) to image support at the following image formation production process, and the toner of other colors carries out color mixture, and cannot adopt recycle of only a black toner as the black toner which operating frequency tends to recycle highly, either. Moreover, especially, at the time of a jam, the toner of other colors on a middle imprint object adheres to image support, and the problem of starting color mixture arises.

[0005] This arranges an image formation means to juxtaposition on two or more set middle imprint object in order of yellow (Y), a Magenta (M), cyanogen (C), and black (K). Color picture formation equipment and yellow (Y) which convey imprint material on a middle imprint object, pile up a toner image one by one and form a color toner image on imprint material, After arranging an image formation means to juxtaposition on two or more set middle imprint object in order of a Magenta (M), cyanogen (C), and black (K) and piling up a toner image one by one on a middle imprint object, a problem with the same said of the color picture formation equipment which imprints on imprint material collectively and forms a color toner image arises.

[0006] It aims at offering the color picture formation equipment which this invention solves the above-mentioned trouble, enables recycle of a black toner with the highest operating frequency, and enables recycle of a black toner with the highest operating frequency especially at the time of a jam.

[0007]

[Means for Solving the Problem] In color picture formation equipment which lays a toner image which the above-mentioned purpose has yellow, a Magenta, cyanogen, and each black image formation unit, and was formed of said each image formation unit one by one on top of belt-like a middle imprint object or imprint material While arranging a black image formation unit in a hand-of-cut maximum upstream location of said middle imprint object and recycling a toner It is attained by color picture formation equipment characterized by arranging yellow, a Magenta, and an image formation unit of cyanogen in a down-stream location, and collecting toners (1st invention).

[0008] Moreover, the above-mentioned purpose has yellow, a Magenta, cyanogen, and each black image formation unit. In color picture formation equipment established with a fixing means in an account toner image of back to front which laid a toner image formed of said each image formation unit one by one on top of belt-like a middle imprint object or imprint material It follows on migration of said middle imprint object contact or whose alienation was enabled at yellow, a Magenta, and an image formation unit of cyanogen at the time of image formation by black toner. It is attained by color picture formation equipment characterized by changing a location of an imprint material

guidance means to said fixing means, or said fixing means (2nd invention).

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained. In addition, the publication of this column limits neither the technical range of a claim, nor a terminological meaning. Moreover, the affirmative explanation in the gestalt of the following operations of this invention does not show the best mode, and does not limit a terminological meaning or the terminological technical range of this invention. In addition, in explanation of the following operation gestalten, the field of the imprint material of the side which counters the surface and the field of another side of imprint material, i.e., a middle imprint object, in the field of the imprint material of the side which counters image support in an imprint region is called rear face, and the image imprinted by the rear face of a surface image and imprint material in the image imprinted by the surface of imprint material is called rear-face image.

[0010] The image formation process of 1 operation gestalt of the color picture formation equipment in connection with this invention and each device are explained using drawing 1 thru/or drawing 4. Drawing 1 is the cross-section block diagram showing 1 operation gestalt of the color picture formation equipment in connection with this invention. Drawing 2 It is drawing showing the toner image formation condition in the color picture formation equipment in connection with this invention. Drawing 2 (A) It is drawing showing the toner image formation condition when imprinting the rear-face image formed in image support on a middle imprint object. Drawing 2 (B) It is drawing showing the toner image formation condition when forming a surface image in image support synchronizing with the rear-face image on a middle imprint object. Drawing 2 (C) It is drawing showing the double-sided image formation to an imprint material top, and drawing 3 is drawing showing migration of alienation and the fixing means of a middle imprint object, and an imprint material guidance means, and drawing 4 is drawing showing other examples of migration of an imprint material guidance means.

[0011] The photo conductor drum whose 10 is the image support for every color in drawing 1, the scorotron electrification machine whose 11 is an electrification means for every color, The exposure optical system whose 12 is an image write-in means for every color, the development counter whose 13 is a development means for every color, The middle imprint belt whose 14a is a middle imprint object, the imprint machine whose 14c is an imprint means for every color, The rear-face imprint machine whose 14g is a rear-face image imprint means, the electric discharge machine whose 14m is an electric discharge means, The paper electrification machine whose 150 is an imprint material electrification means, the paper separation AC electric discharge machine whose 14h is an imprint material separation means, the conveyance section which has the spur 162 whose 160 is an imprint material guidance means, and 17 are anchorage devices which are fixing means.

[0012] In this operation gestalt The cleaning equipment 19 which is the photo conductor drum 10 which is the image support for every color, the scorotron electrification machine 11 which is an electrification means for every color, the exposure optical system 12 which is an image write-in means for every color, the development counter 13 which is a development means for every color, and a photo conductor drum cleaning means for every color The image formation unit 100 is constituted using these as 1 set. Black (K), As opposed to the hand of cut of middle imprint belt 14a rotated to the counterclockwise rotation which forms yellow (Y), a Magenta (M), and 4 sets of image formation units 100 for every color of cyanogen (C), and shows them by the arrow head of drawing 1 according to the color and sequence to form Black (K) is arranged in order of yellow (Y), a Magenta (M), and cyanogen (C) following the maximum upstream. The image formation unit 100 of Y, M, and C may be arranged in order of C, M, and Y.

[0013] The photo conductor drum 10 which is image support forms sensitization layers, such as a conductive layer, an a-Si layer, or an organic sensitization layer (OPC), in the periphery of the metal base of the shape of a cylinder formed for example, of aluminum material, and rotates to the clockwise rotation shown by the arrow head of drawing 1 where a conductive layer is grounded.

[0014] By the control grid held at predetermined potential, respectively, the toner by the corona discharge electrode, and the corona discharge of like-pole nature, the scorotron electrification machine 11 which is an electrification means performs the electrization (it sets in this operation gestalt and is minus electrification), and gives uniform potential to the photo conductor drum 10. As a corona discharge electrode of the scorotron electrification machine 11, it is also possible to, use a serrate electrode and a needlelike electrode in addition to this.

[0015] The exposure optical system 12 which is an image write-in means is arranged around the photo conductor drum 10, as the exposure location on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. The exposure optical system 12 is a unit for exposure which consists of optical focusing nature optical transmission objects (trade name: SELFOC lens array) as the exposure element and image formation element of the line which arranged two or more LED (light emitting diode) as the drum shaft of the photo conductor drum 10, and a light emitting device of the image exposure light arranged by parallel in the main scanning direction in the shape of an array. It is also possible to, use a laser beam study system in addition to this as exposure optical system 12. The exposure optical system 12 for every color carries out image exposure of the sensitization layer of the photo conductor drum 10 according to the image data of each color which was read by the image reader of another object and was memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10 for every color.

[0016] The development counter 13 which is a development means maintains a predetermined gap to the peripheral

surface of the photo conductor drum 10. The thickness of 0.5-1mm rotated to the hand of cut and the forward direction of the photo conductor drum 10. It had the development sleeve 131 formed by the nonmagnetic stainless steel or the nonmagnetic aluminum material of the shape of a cylinder with an outer diameter of 15-25mm, and one component or two component developer of yellow (Y), a Magenta (M), cyanogen (C), and black (K) is held in the interior according to the development color for every color. Un-illustrating dashes a development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100-500 micrometers, by the koro, is maintained at non-contact, by impressing the development bias which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs non-contact reversal development and forms a toner image on the photo conductor drum 10. Toner feed hopper 13a is prepared in the development counter 13 for every color, and the developer of the color which followed the development color of a development counter 13 from toner feed hopper 13a is supplied. It dissociates with a development counter 13, toner feed hopper 13a for every color is prepared in the equipment upper part (upper right of the color picture formation equipment of drawing 1), without preparing toner feed hopper 13a as a development counter 13 and one, and it may be made to supply a developer.

[0017] A volume resistivity is the endless belt of 109 - 1012 ohm-cm preferably 108 to 1016 ohm-cm, for example, middle imprint belt 14a which is a middle imprint object is the seamless belt of the two-layer configuration which performed fluorine coating with a thickness of 5-50 micrometers on the outside of a half-conductivity film base with a thickness of 0.1-1.0mm which distributed the electrical conducting material to engineering plastics, such as denaturation polyimide, heat-curing polyimide, an ethylene tetrafluoroethylene copolymer, polyvinylidene fluoride, and a nylon alloy, as a toner filming prevention layer preferably. If it considers as the base of middle imprint belt 14a, a half-conductivity rubber belt with a thickness of 0.5-2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber. 14d of driving rollers and ground roller 14j whose middle imprint belt 14a is a roller member, respectively, and a belt — alienation — it is laid [ firmly ] across axis-of-rotation roller 14k, follower roller 14e, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow head of drawing 1. follower roller 14e, ground roller 14j, and a belt — alienation — it fixes and rotates, and tension roller 14i is supported by elasticity, such as a non-illustrated spring, movable, and rotates axis-of-rotation roller 14k and 14d of driving rollers. 14d of driving rollers rotates in response to a drive [ drive motor / non-illustrated ], and middle imprint belt 14a is driven and it is made to rotate. rotation of middle imprint belt 14a — ground roller 14j and a belt — alienation — axis-of-rotation roller 14k, follower roller 14e, and tension roller 14i follow and rotate. The belt slack of middle imprint belt 14a under rotation becomes it tense by tension roller 14i. a belt — alienation — axis-of-rotation roller 14k is prepared between the location of the image formation unit 100 of K arranged in the hand-of-cut maximum upstream location of middle imprint belt 14a, and image formation unit 100 location of the following Y. The recording paper P which is imprint material is supplied to the location where middle imprint belt 14a is laid [ firmly ] across follower roller 14e, and it is conveyed by middle imprint belt 14a. In the curvature section KT of the edge by the side of the anchorage device 17 of middle imprint belt 14a laid by 14d of driving rollers, the recording paper P is separated from middle imprint belt 14a.

[0018] The image formation unit 100 for every color is arranged in the outside (on drawing 1) of middle imprint belt 14a which is the above-mentioned middle imprint object, and middle imprint belt 14a is minded. Counter with 14d of driving rollers, and 14h of paper separation AC electric discharge machines which are an imprint material separation means Counter with ground roller 14j and 14g of rear-face imprint machines which are a rear-face image imprint means Moreover, counter with follower roller 14e and the middle imprint belt cleaning equipment 140 which is a middle imprint object cleaning means is formed. Moreover, on both sides of middle imprint belt 14a, it counters with the photo conductor drum 10 of the image formation unit 100 for every color, it arranges to imprint machine 14c and this imprint machine 14c which are an imprint means for every color, and 14m of electric discharge machines which are the electric discharge means of a middle imprint object is formed.

[0019] Imprint machine 14c which is an imprint means for every color is a corona discharge machine which counters the photo conductor drum 10 for every color, and is formed on both sides of middle imprint belt 14a, and forms imprint region 14b for every color between middle imprint belt 14a and the photo conductor drum 10 for every color. The direct current voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) is impressed to imprint machine 14c for every color, and the toner image on the photo conductor drum 10 for every color is imprinted by forming imprint electric field in imprint region 14b on a middle imprint belt 14a top or the surface of imprint material.

[0020] It is preferably constituted by the corona-discharge machine, it is prepared in imprint machine 14c and ground roller 14j prepared between 14d of driving rollers face to face on both sides of middle imprint belt 14a, the direct current voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) is impressed, and 14g of rear-face imprint machines which are a rear-face image imprint means imprints the toner image on middle imprint belt 14a at the rear face of the recording paper P.

[0021] 14m of electric discharge machines which are an electric discharge means for every color is constituted by the corona discharge machine. To the migration direction of middle imprint belt 14a if needed to the downstream of imprint machine 14c which is an imprint means for every color It stands in a row with imprint machine 14c for every color, and it is prepared, the alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and the charge of middle imprint belt 14a in which an electric charge is carried out by voltage impression of imprint machine 14c is discharged.

[0022] It is preferably constituted by the serrate electrode, and it counters with follower roller 14e grounded on both sides of middle imprint belt 14a, and is prepared, and the direct current voltage of a toner and like-pole nature

(it sets in this operation gestalt and is minus polarity) is impressed, the paper electrification machine 150 which is an imprint material electrification means is charged, and middle imprint belt 14a is made to adsorb the recording paper P in it. It is also possible to use the paper electrification brush in which the contact and contact discharge to a corona discharge machine or middle imprint belt 14a other than a serrate electrode are possible, a paper electrification roller, etc. as a paper electrification machine 150.

[0023] 14h of paper separation AC electric discharge machines which are an imprint material separation means is preferably constituted by the corona discharge machine. Counter 14d of driving rollers grounded by the anchorage device 17 side-edge section of middle imprint belt 14a on both sides of middle imprint belt 14a if needed, and it is prepared. The alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity if needed is impressed, the recording paper P conveyed by middle imprint belt 14a is discharged, and it dissociates from middle imprint belt 14a.

[0024] The conveyance section 160 has the spur 162 which is an imprint material guidance means, and is prepared between the curvature section KT of the edge by the side of the anchorage device 17 of middle imprint belt 14a, and an anchorage device 17. The conveyance section 160 prevents that, and become or a toner fixes on middle imprint belt 14a with the heat from an anchorage device 17 that the toner image supported by middle imprint belt 14a becomes with some welding, and it is hard to imprint. [ that middle imprint belt 14a deforms ]

[0025] The spur 162 which is an imprint material guidance means has two or more height 162a in a peripheral surface, and is prepared free [ rotation ] centering on the rotation support shaft 165. A spur 162 guides the rear-face side of the recording paper P, conveys the recording paper P, fixing the penetration direction to the anchorage device 17 of the recording paper P, is stabilized and conveys the recording paper P to an anchorage device 17 while it prevents turbulence of the rear-face toner image of the recording paper P which has a toner image to both sides.

[0026] The anchorage device 17 which is a fixing means is established in the toner image on the recording paper P which has the nip section T conveyed by consisting of fixing members of the two shape of a roller of fixing roller 17a and sticking-by-pressure roller 17b which have a heater inside, carrying out pinching conveyance of the recording paper P in the nip section T between fixing roller 17a and sticking-by-pressure roller 17b, and adding heat and a pressure.

[0027] Next, an image formation process is explained.

[0028] By starting of the photo conductor drive motor which is not illustrated by the start of image recording, the photo conductor drum 10 of the image formation unit 100 of the black (K) arranged in the hand-of-cut maximum upstream location of middle imprint belt 14a rotates to the clockwise rotation shown by the arrow head of drawing 1, and grant of potential is started by the photo conductor drum 10 of K by the electrization of the scorotron electrification machine 11 of K at coincidence.

[0029] After potential is given to the photo conductor drum 10 of K, the image store by the 1st chrominance signal, i.e., the electrical signal corresponding to the image data of K, is started by the exposure optical system 12 of K, and it has an electrostatic latent image corresponding to the image of K of a manuscript image formed in the surface of the photo conductor drum 10 of K.

[0030] Reversal development of the aforementioned latent image is carried out in the non-contact condition by the development counter 13 of K, and a black (K) toner image is formed according to rotation of the photo conductor drum 10 of K.

[0031] The toner image of K used as the rear-face image formed of the above-mentioned image formation process on the photo conductor drum 10 of K which is image support is imprinted by imprint machine 14c of K which is an imprint means in imprint region 14b of K on middle imprint belt 14a which is a middle imprint object. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of K is discharged with 14vessels of electric discharge machines of K.

[0032] Subsequently, the toner image of K and a synchronization are taken and, as for middle imprint belt 14a, potential is given by the image formation unit 100 of yellow (Y) by the electrization of the scorotron electrification machine 11 of Y. The image store by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of Y, is performed by the exposure optical system 12 of Y. Of imprint machine 14c of Y whose toner image of Y used as the rear-face image formed on the photo conductor drum 10 of Y of the non-contact reversal development by the development counter 13 of Y is an imprint means in imprint region 14b of Y, from on the toner image of the aforementioned K, the toner image of Y piles up and is formed. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of Y is discharged with 14vessels of electric discharge machines of Y.

[0033] According to the same process, the superposition toner image of K and Y and a synchronization are taken. The toner image of M used as the rear-face image corresponding to the image data of M by the 3rd chrominance signal formed on the photo conductor drum 10 of M of the image formation unit 100 of a Magenta (M) sets to imprint region 14b of M. Of imprint machine 14c of M which is an imprint means, from on the aforementioned K and the toner image of Y, the toner image of M piles up and is formed. Furthermore the superposition toner image of K, Y, and M and the synchronization were taken, and were formed on the photo conductor drum 10 of C of the image formation unit 100 of cyanogen (C). The toner image of C used as the rear-face image used as the rear-face image corresponding to the image data of C by the 4th chrominance signal sets to imprint region 14b of C. Of imprint machine 14c of C which is an imprint means, the toner image of C piles up, and is formed from on the aforementioned toner image of K, Y, and M, and the superposition color toner image of K, Y, M, and C of a rear-face image is formed on middle imprint belt 14a. Moreover, the charge of middle imprint belt 14a in which the electric

charge was carried out by imprint machine 14c of M and C is discharged with 14vessels of electric discharge machines of M and C. ( Drawing 2 (A) ).

[0034] Although cleaned by cleaning-blade 19a which consists of the rubber material which the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint resulted in the cleaning equipment 19 as a photo conductor drum cleaning means, and contacted the photo conductor drum 10 The toner which collected in the cleaning equipment 19 of the image formation unit 100 of the black (K) arranged in the hand-of-cut maximum upstream location of middle imprint belt 14a is discharged by screw 19c from cleaning equipment 19. For example, through conveyance pipe 19d which connotes the rotating spiral spring and conveys a toner, it is conveyed again to the development counter 13 of K, and is recycled (reclamation). It is arranged at the downstream of the black (K) image formation unit 100, the toner image supported on middle imprint belt 14a may carry out a re-imprint (adhesion) to the photo conductor drum 10 at the following image formation production process, and reclamation can be impossible easily. The toner in the cleaning equipment 19 formed in yellow (Y), a Magenta (M), and each image formation unit 100 of cyanogen (C) is discharged by screw 19c from cleaning equipment 19. For example, it is conveyed to the container 190 for toner recycling through conveyance pipe 19d which connotes the rotating spiral spring and conveys a toner, and is collected in the container 190 for toner recycling. It becomes recyclable [ a black toner ], without the toner of other colors carrying out color mixture to the black toner which operating frequency tends to recycle highly by this.

[0035] After the superposition color toner image which turns into a rear-face image on middle imprint belt 14a as mentioned above is formed, the synchronization with the color toner image of the rear-face image currently succeedingly supported by middle imprint belt 14a is taken, and the toner image of K which turns into a surface image of K by the image formation unit 100 of K is formed on the photo conductor drum 10 of K like the above-mentioned color picture formation process. Under the present circumstances, image data is changed so that the surface image of K formed on the photo conductor drum 10 of K may turn into a mirror image to the rear-face image formed on the photo conductor drum 10 of said K.

[0036] In connection with the surface image formation of K to the photo conductor drum 10 top of K, from the sheet paper cassette 15 whose recording paper P which is imprint material is an imprint material receipt means It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. By the drive of timing roller 15b The synchronization with the toner image of the surface image of K supported on the photo conductor drum 10 of K and the color toner image of the rear-face image currently supported by middle imprint belt 14a is taken, and imprint region 14b of K is fed. Under the present circumstances, paper electrification is carried out at a toner and like-pole nature, middle imprint belt 14a is adsorbed by the paper electrification machine 150 serrate in the tip where it considered as the contact condition and the direct current voltage of a toner and like-pole nature (it sets in this operation gestalt and is minus polarity) was impressed to the recording paper P, and imprint region 14b of K is fed with the recording paper P with it ( drawing 2 (B) ). By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on middle imprint belt 14a, and the toner image on the photo conductor drum 10 of K, and turbulence of a toner image is prevented.

[0037] In imprint region 14b of K, the surface image on the photo conductor drum 10 of K is imprinted by imprint machine 14c of K as an imprint means by which the voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) was impressed, on the surface of the recording paper P. At this time, the rear-face image on middle imprint belt 14a exists on middle imprint belt 14a without the recording paper's P imprinting. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of K is discharged with 14vessels of electric discharge machines of K.

[0038] Similarly the synchronization with the color toner image of a rear-face image and the toner image of the surface image of K which are supported by middle imprint belt 14a is taken. The toner image of the surface image of Y, M, and C is formed on the photo conductor drum 10 of the image formation unit 100 of Y, M, and C. The toner image of the surface image of Y, M, and C by each imprint machine 14c as an imprint means by which the voltage of a toner and antipole nature (it sets in this operation gestalt and is plus polarity) was impressed by imprint region 14b of Y, M, and C Y on each photo conductor drum 10, The sequential imprint of the color toner image of the surface image of M and C is carried out on the surface of the recording paper P at the order of Y, M, and C. Moreover, the charge of middle imprint belt 14a in which the electric charge was carried out by imprint machine 14c of Y, M, and C is discharged with 14vessels of electric discharge machines of Y, M, and C. At this time, the rear-face image on middle imprint belt 14a exists on middle imprint belt 14a without the recording paper's P imprinting. Under the present circumstances, with having mentioned above, similarly, image data is changed so that the surface image of Y, M, and C which are formed on the photo conductor drum 10 of Y, M, and C may become with a mirror image to the rear-face image formed on said photo conductor drum 10 of Y, M, and C, respectively.

[0039] The recording paper P with which the color toner image was imprinted by the surface is conveyed at a toner and 14g of rear-face imprint machines as a rear-face image imprint means by which the voltage of antipole nature (it sets in this operation gestalt and is plus polarity) was impressed, and the color toner image of the rear-face image on the peripheral surface of middle imprint belt 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P ( drawing 2 (C) ).

[0040] The recording paper P with which the color toner image was formed in both sides According to the curvature of the curvature section KT of middle imprint belt 14a, and the electric discharge operation with 14h of paper separation AC electric discharge machines as an imprint material separation means formed in the edge of middle imprint belt 14a if needed Dissociate from middle imprint belt 14a, and it is conveyed through the spur 162 prepared

in the conveyance section 160 to the anchorage device 17 as a fixing means. It is fixed to the toner image on the recording paper P by conveying between the nip sections T between fixing roller 17a and sticking-by-pressure roller 17b, and being able to add heat and a pressure in the nip section T. The recording paper P with which double-sided image recording was made has the front reverse side reversed, is sent, and is discharged with the delivery roller 18 to the tray of the equipment exterior.

[0041] The toner which remained on the peripheral surface of middle imprint belt 14a after an imprint is countered and prepared in follower roller 14e on both sides of middle imprint belt 14a, and is cleaned by the middle imprint object cleaning equipment 140 which is a middle imprint object cleaning means have the middle imprint object cleaning blade 141 in which contact and contact discharge are possible in middle imprint belt 14a by using a pivot 142 as the rotation supporting point.

[0042] Moreover, cleaning equipment 19 removes a residual toner, the hysteresis of the photo conductor drum 10 in previous image formation is canceled with the uniform photographic filter before non-illustrated electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is in the following image formation cycle. As mentioned above, the toner which collected in the cleaning equipment 19 of the image formation unit 100 of the black (K) arranged in the hand-of-cut maximum upstream location of middle imprint belt 14a is conveyed again to the development counter 13 of K, and is recycled (reclamation). It is arranged at the downstream of the black (K) image formation unit 100, the toner image supported on middle imprint belt 14a may carry out a re-imprint (adhesion) to the photo conductor drum 10 at the following image formation production process, and reclamation can be impossible easily. The toner in the cleaning equipment 19 formed in yellow (Y), a Magenta (M), and each image formation unit 100 of cyanogen (C) is conveyed to the container 190 for toner recycling, and are collected in the container 190 for toner recycling.

[0043] It becomes recyclable [ the black toner which is not conspicuous even if it is prevented by the above that the black toner on a middle imprint object adheres to the image support of other colors, operating frequency is high and it carries out color mixture most by it ]. It becomes recyclable [ the black toner which is not conspicuous even if it is prevented that the black toner on a middle imprint object adheres to the image support of other colors especially at the time of a jam, operating frequency is high and it carries out color mixture most ].

[0044] Of course, also do single-sided image formation which forms an image at one side of only the surface of imprint material, or a rear face out of the double-sided image formation which forms an image in both sides of imprint material which was explained with the above-mentioned operation gestalt with above color picture formation equipment.

[0045] Pivotal considering the medial axis J1 of axis-of-rotation roller 14k as a center moreover, the belt with which middle imprint belt 14a is inscribed in the support plate 301 of both sides according to drawing 3 — alienation — It is arranged in the hand-of-cut maximum upstream location of middle imprint belt 14a. The downstream of the black (K) image formation unit 100 in which toner recycle is possible, The photo conductor drum 10 of the image formation unit 100 of Y, M, and C, and Y which counters, 14d of driving rollers which lay M, imprint machine 14c of C, and 14m of electric discharge machines and 14g of rear-face imprint machines of Y, M, and C, 14h of paper separation AC electric discharge machines and middle imprint belt 14a, the belt of ground roller 14j, tension roller 14i, and the support plate 301 center of rotation — alienation — axis-of-rotation roller 14k etc. is attached in a support plate 301. Moreover, the support plate 302 of both sides is pivotable considering the medial axis J2 of 14d of driving rollers as a center, and the spur 162 and anchorage device 17 which are an imprint material guidance means are attached in a support plate 302.

[0046] the time of the monochrome image formation by the black (K) toner — a belt — alienation — a support plate 301 is rotated focusing on the medial axis J1 of axis-of-rotation roller 14k, the support plate 301 which has middle imprint belt 14a is moved, and middle imprint belt 14a is made to estrange from yellow (Y), a Magenta (M), and the image formation unit 100 of cyanogen (C).

[0047] The rack LK in which the lever 310 which holds a support plate 301 after having been dashed against the bottom edge of a support plate 301 by stopper 302a which was engaged in the end and prepared in the support plate 301 was formed by the other end

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[Translation done.]



**\* NOTICES \***

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** It is the cross-section block diagram showing 1 operation gestalt of the color picture formation equipment in connection with this invention.

**[Drawing 2]** It is drawing showing the toner image formation condition in the color picture formation equipment in connection with this invention.

**[Drawing 3]** It is drawing showing migration of alienation and the fixation means of a medium imprint object, and an imprint material advice means.

**[Drawing 4]** It is drawing showing other examples of migration of an imprint material advice means.

**[Description of Notations]**

10 Photo Conductor Drum  
11 Scorotron Electrification Machine  
12 Exposure Optical System  
13 Development Counter  
14a Medium imprint belt  
14c Imprint machine  
14d Driving roller  
14g Rear-face imprint machine  
14h Paper separation AC electric discharge machine  
14k a belt -- alienation -- an axis-of-rotation roller  
17 Anchorage Device  
19 Cleaning Equipment  
100 Image Formation Unit  
162 Spur  
190 Container for Toner Recycling  
301,302,303 Support plate  
P Recording paper

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**[Translation done.]**

## \* NOTICES \*

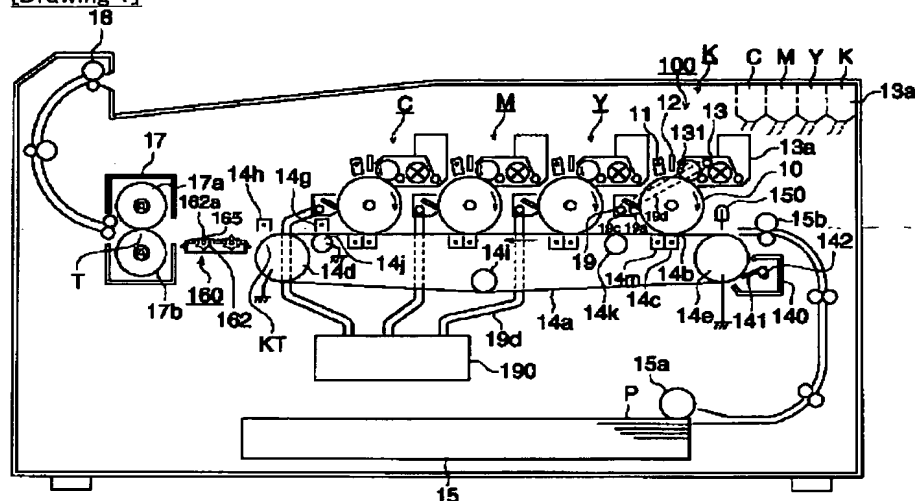
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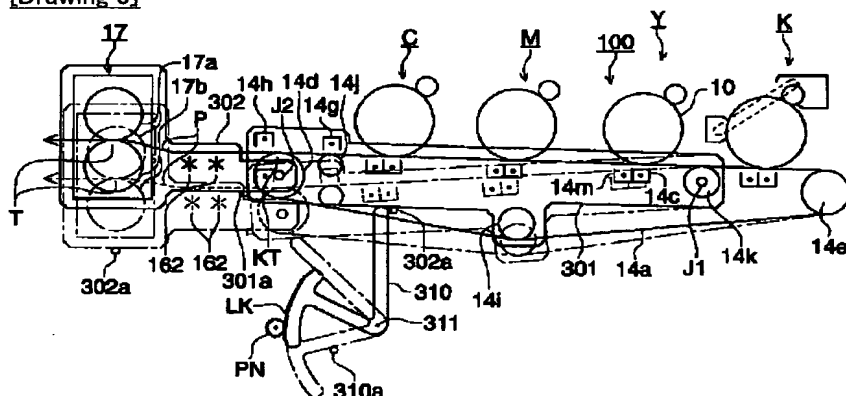
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## DRAWINGS

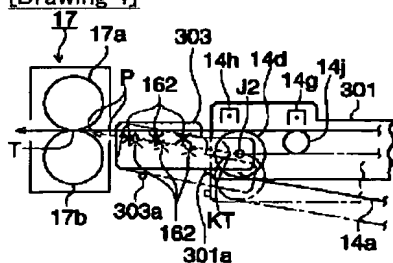
[Drawing 1]



[Drawing 3]

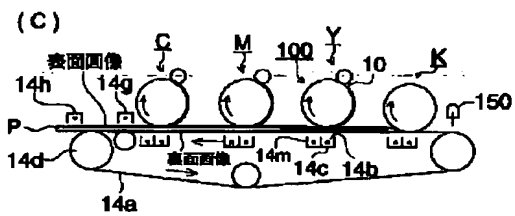
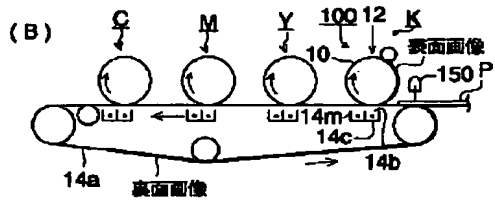
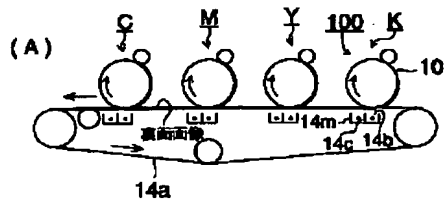


[Drawing 4]



[Drawing 2]

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(19) 日本国特許庁 (JP) (12) 公開特許公報 (A)

(11) 特許出願公開番号  
特開2000-206755  
(P2000-206755A)  
(43) 公開日 平成12年7月28日 (2000.7.28)

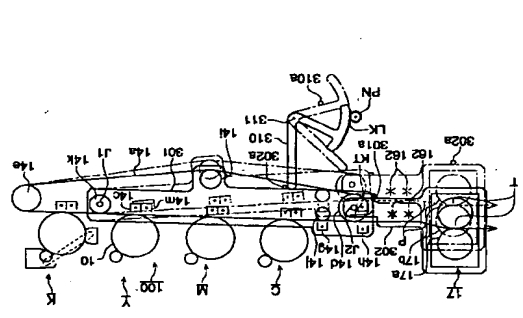
(51) IntCl. <sup>7</sup>	識別記号	PI	チコード(参考)
G 03 G 15/01	111	G 03 G 15/01	L 2H028
	106		111Z 2H030
	507		106 2H034
	21/10		507D 2H077
			326

審査請求 未請求 請求項の数 3 O L (全 9 頁)

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(54) 発明の名称 カラー画像形成装置

(57) 要約  
【課題】 最も使用頻度の高い黒色トナーのリサイクルを可能とし、特にジャム時においても、最も使用頻度の高い黒色トナーのリサイクルを可能とするカラー画像形成装置を提供すること。  
【解決手段】 黒色の画像形成ユニットを中間転写体の回転方向上流位置に配設してトナーのリサイクルを行うとともに、イエロー、マゼンタ及びシアンの画像形成ユニットを下流位置に配設してトナーの回収を行うことを特徴とするカラー画像形成装置。





電される。

【0033】同様のプロセスにより、K、Yの重ね合わせトナー像と同期が取られ、マゼンタ(M)の画像形成ユニット100によりMの感光体ドラム10上に形成された、第3の色番号によるMの画像データに対応する真画像となるMのトナー像が、Mの転写域14bにおいて、転写手段であるMの転写器14cによって、前記のK、Yのトナー像の上からMのトナー像が重ね合わせて形成され、更にK、Y、Mの重ね合わせトナー像と同期が取られ、シアン(C)の画像形成ユニット100によりCの感光体ドラム10上に形成された、第4の色番号によるCの画像データに対応する真画像となる真画像となるCのトナー像が、Cの転写域14bにおいて、転写手段であるCの転写器14cによって、前記のK、Y、Mのトナー像の上からCのトナー像が重ね合わせて形成され、中間転写ベルト14a上に真画像のK、Y、M及びCの重ね合わせカラートナー像が形成される。

【0026】定着手段である定着装置17は、内部にヒータを有する定着ローラ17aと圧着ローラ17bとの2本のローラ状の定着部材で構成され、定着ローラ17aと圧着ローラ17bとの間のニップ部Tで記録紙Pを挟持搬送し、熱と圧力とをくわえることにより、ニップ部Tを搬送される記録紙P上のトナー像を定着する。

【0027】次に画像形成プロセスを説明する。

【0028】画像記録のスタートにより不図示の感光体駆動モータの起動により、中間転写ベルト14aの回転方向最上流位置に配置される黒色(K)の画像形成ユニット100の感光体ドラム10が図1の矢印で示す時計方向へ回転され、同時にKのスコロトロン帯電器11の帯電作用によりKの感光体ドラム10に電位の付与が開始される。

【0029】Kの感光体ドラム10は電位を付与されたあと、Kの露光光学系12によって第1の色番号すなわちKの画像データに対応する電気信号による画像データが開始され、Kの感光体ドラム10の表面に原稿画像のKの画像に対応する静電潜像を形成される。

【0030】前記の潜像はKの現像器13により非接触状態で反転現像されるKの感光体ドラム10の回転に応じ黒色(K)のトナー像が形成される。

【0031】上記の画像形成プロセスによって像担持体であるKの感光体ドラム10上に形成された真画像と、中間転写ベルト14a上に保持されるトナー像が次のKのトナー像が、Kの転写域14bにおいて、転写手段であるKの転写器14cによって、中間転写体である中間転写ベルト14a上に転写される。またKの転写器14cにより荷電された中間転写ベルト14aの電荷はKの除電器14mにより除電される。

【0032】次いで中間転写ベルト14aは、Kのトナー像と同期が取られ、イエロー(Y)の画像形成ユニット100によりYのスコロトロン帯電器11の帯電作用により電位が付与され、Yの露光光学系12によって第2の色番号すなわちYの画像データに対応する電気信号による画像データが行われ、Yの現像器13による非接触の反転現像によってYの感光体ドラム10上に形成された真画像となるYのトナー像が、Yの転写域14bにおいて、転写手段であるYの転写器14cによって、前記のKのトナー像の上からYのトナー像が重ね合わせて形成される。またYの転写器14cにより荷電された中間転写ベルト14aの電荷はYの除電器14mにより除

感光体ドラム10上に形成される。この際、Kの感光体ドラム10上に形成されるKの真画像は、前記Kの感光体ドラム10上に形成した真画像に対して真像とならうように画像データが変更される。

【0036】Kの感光体ドラム10上へのKの真画像形成にもなると転写材である記録紙Pが転写材収納手段である給紙カセット15より、送り出しローラ15aにより送り出され、転写材給送手段としてのタイミングローラ15bへ搬送され、タイミングローラ15bの駆動によって、Kの感光体ドラム10上に保持されたKの真画像のトナー像と、中間転写ベルト14aに保持されている真画像のカラートナー像との同期がとられてKの転写域14bへ給送される。この際、記録紙Pに当接状態とされトナーと同極性(本実施形態においてはマインス極性)の直流電圧が印加された先端が給紙状の紙帯電器150により、記録紙Pがトナーと同極性に紙帯電され、中間転写ベルト14aに吸着されたKの転写域14bへ給送される(図2(B))。トナーと同極性に紙帯電を行うことにより、中間転写ベルト14a上のトナー像やKの感光体ドラム10上のトナー像と引き合うことを防止し、トナー像の乱れを防止している。

【0037】Kの転写域14bではトナーと反対極性(本実施形態においてはプラス極性)の電圧が印加され、転写手段としてのKの転写器14cによつてKの感光体ドラム10上の真画像が記録紙Pの表面に転写される。このとき、中間転写ベルト14a上の真画像は記録紙Pに転写されないで中間転写ベルト14a上に存在する。またKの転写器14cにより荷電された中間転写ベルト14aの電荷はKの除電器14mにより除電される。

【0038】同様にして、中間転写ベルト14aに保持されている真画像のカラートナー像とKの真画像のトナー像との同期がとられて、Y、M、Cの画像形成ユニット100によりY、M、Cの真画像のトナー像が感光体ドラム10上に形成され、Y、M、Cの真画像のトナー像がY、M、Cの転写域14bでトナーと反対極性(本実施形態においてはプラス極性)の電圧が印加された転写手段としての各転写器14cによつて各感光体ドラム10上のY、M、Cの真画像のカラートナー像が、Y、M、Cの順に記録紙Pの表面に順次転写される。またY、M、Cの電荷はY、M、Cの除電器14mにより除電される。このとき、中間転写ベルト14a上の真画像は記録紙Pに転写されないで中間転写ベルト14a上に存在する。この際前述したと同様に、Y、M、Cの感光体ドラム10上に形成されるY、M、Cの真画像は、前記Y、M、Cの感光体ドラム10上に形成した真画像に対してそれぞれ真像となるように画像データが変更される。

【0039】真画像にカラートナー像が転写された記録紙

Pは、トナーと反対極性(本実施形態においてはプラス極性)の電圧を印加した真画像転写手段としての真転写器14gへと搬送され、真転写器14gにより中間転写ベルト14aの周面上の真画像のカラートナー像が一括して記録紙Pの表面に転写される(図2(C))。

【0040】真画像にカラートナー像が形成された記録紙Pは、中間転写ベルト14aの曲率部KTの曲率と、中間転写ベルト14aの端部に必要に応じて設けられる転写分離手段としての紙分離AC除電器14hにより、除電作用となり、中間転写ベルト14aから分離され、搬送部160に送られる。搬送部162を通して定着手段としての定着装置17へと搬送され、定着ローラ17aと圧着ローラ17bとの間のニップ部T間を搬送され、ニップ部Tで熱と圧力とをくわえられることにより記録紙P上のトナー像が定着される。真画像記録がなされた記録紙Pは表裏を反転されて送られ、排紙ローラ18により装置外部のトレイへ排出される。

【0041】転写後の中間転写ベルト14aの周面上に残ったトナーは、中間転写ベルト14aを挟んで逆動ローラ14eに対向して設けられ、支軸142を回転支点として中間転写ベルト14aに当接及び当接解除可能な中間転写クリーニング装置141を有する中間転写体クリーニング手段である中間転写体クリーニング装置140によりクリーニングされる。

【0042】また、転写後の各色毎の感光体ドラム10の周面上に残ったトナーは、クリーニング装置19により残留トナーを除去され不図示の帯電器の一枚露光器により先の画像形成における感光体ドラム10の履歴が解消されて、次の画像形成サイクルにはいり、前述したように、中間転写ベルト14aの回転方向最上流位置に配置される黒色(K)の画像形成ユニット100のクリーニング装置19内に溜まったトナーは再度Kの現像器13へと搬送されてリサイクル(再利用)され、黒色(K)の画像形成ユニット100の下流側に配置され、中間転写ベルト14a上に保持されるトナー像が次の画像形成工程で感光体ドラム10に再転写(付着)する可能性があり再利用ができにくい、イエロー(Y)、マゼンタ(M)及びシアン(C)の各画像形成ユニット100に設けられるクリーニング装置19内のトナーはトナー回収器190へと搬送され、トナー回収器190内に回収される。

【0043】上記により、中間転写体上の黒色トナーが他の色の像担持体に付着することが防止され、最も使用頻度が高く混色しても目立たない黒色トナーのリサイクルが可能となる。特にジャム時においても、中間転写体上の黒色トナーが他の色の像担持体に付着することが防止され、最も使用頻度が高く混色しても目立たない黒色トナーのリサイクルが可能となる。

【0044】上記のカラー真画像形成装置では、上述の真

態形態で説明しようとする転写材の両面に画像を形成する両面画像形成の外に、転写材の表面または裏面のみの片側に画像を形成する片面画像形成もなされ得ることは勿論である。

【0045】また図3によれば、同側の支持板301は中間転写ベルト14aに内蔵されるベルト駆動回転軸ローラ14kの中心軸J1を中心として回転可能であり、中間転写ベルト14aの回転方向最上流位置に配置され、トナーリサイクル可能な黒色(K)の画像形成ユニット100の下流側の、Y、M、Cの画像形成ユニット100の感光体ドラム10と対向するY、M、Cの転写器14c及びY、M、Cの除電器14hや中間転写器14gや紙分離AC除電器14hや中間転写ベルト14aを張架する駆動ローラ14d、アースローラ14j、デレクションローラ14i及び支持板301回転中心のベルト駆動回転軸ローラ14k等が支持板301に取付けられる。また同側の支持板302は駆動ローラ14dの中心軸J2を中心として回転可能であり、転写材案内手段である拍車162や定着装置17が支持板302に取付けられる。

【0046】黒色(K)のトナーによるモノクロ画像形成時、ベルト駆動回転軸ローラ14kの中心軸J1を中心として支持板301を回転して、中間転写ベルト14aを有する支持板301を移動し、中間転写ベルト14aをイエロー(Y)、マゼンタ(M)及びシアン(C)の画像形成ユニット100から離間させる。

【0047】支持板301の下側端部に、その一端にて係合し、支持板301に設けられたストッパ302aに突き当てられた状態で支持板301を保持するレバー310を、その他端に設けられたラックLKと、鼓ラックLKに嵌合し、例えば不図示の操作部よりモノクロ画像形成の選択時に不図示の制御部及び駆動モータを通して位置から一点線表示位置に固定軸311を中心としてレバー310が回転され、これに伴い支持板301が図3に実線表示位置から一点線表示位置にベルト駆動回転軸ローラ14kの中心軸J1を支点としてストッパ310aに当接するまで回転され、中間転写ベルト14aがKの画像形成ユニット100には当接したままの状態で、Y、M及びCの画像形成ユニット100から離間される。この際、定着装置17への配線紙Pの進入を確保するため、支持板301に設けられたストッパ303により、支持板301に設けられた支持板302が駆動ローラ14dの移動とともに、駆動ローラ14dの中心軸J2を中心として回転せながら、ストッパ302aにて係止される位置まで下方に移動される。支持板302の移動に伴い、拍車162及び定着装置17が下方に移動（位置変更）される。配線紙Pは図3に点線で示すように、下方に移動された拍車162により案内されて、下方に移動された定着装置17へと搬送され、定着ロー

ラ17aと圧着ローラ17bとの間のニップ部J間を搬送され、ニップ部Jで熱と圧力とをくわえられることにより配線紙P上のトナー像が定着される。

【0048】また図4に示すように、転写材案内手段である拍車162が取付けられ、駆動ローラ14dの中心軸J2を中心として回転可能な支持板303を設け、中間転写ベルト14aを有する支持板301の下方向の移動（図4に実線で示す位置から一点線表示位置への移動）に伴い、定着装置17への配線紙Pの進入を確保するため、支持板301に設けられたストッパ301aにより係止、保持されていた同側の支持板303を、駆動ローラ14dの移動とともに、図4に実線で示す位置から一点線表示位置に、駆動ローラ14dの中心軸J2を中心として回転させながら、ストッパ303aにて係止される位置まで傾斜して移動させることも可能である。支持板303の移動に伴い、拍車162が傾斜して下方に移動（位置変更）される。配線紙Pは図4に点線で示すように、傾斜して配置された拍車162により案内されて定着装置17へと搬送され、定着ローラ17aと圧着ローラ17bとの間のニップ部J間を搬送され、ニップ部Jで熱と圧力とをくわえられることにより配線紙P上のトナー像が定着される。

【0049】上記により、中間転写体上の黒色トナーが他の色の像担持体に付着することが防止され、最も使用頻度が低く、最も目立たない黒色トナーのリサイクルが可能となる。特にジャム時においても、中間転写体上の黒色のトナーが他の色の像担持体に付着することが防止され、最も使用頻度が低く、最も目立たない黒色トナーのリサイクルが可能となる。

【0050】上記図2ないし図4にて説明した構成は、イエロー(Y)、マゼンタ(M)、シアン(C)及び黒色(K)の順に像形成手段を複数組中間転写体上に並列に配置し、中間転写体上に転写材を搬送し、転写材上に順次トナー像を重ね合わせてカラートナー像を形成するカラー画像形成装置やイエロー(Y)、マゼンタ(M)、シアン(C)及び黒色(K)の順に像形成手段を複数組中間転写体上に並列に配置し、中間転写体上に転写材に転写してカラートナー像を形成することが可能であり、これにより前述したと同様の効果、即ち、中間転写体上の黒色トナーが他の色の像担持体に付着することが防止され、最も使用頻度が低く、最も目立たない黒色トナーのリサイクルが可能となる。特にジャム時においても、中間転写体上の黒色のトナーが他の色の像担持体に付着することが防止され、最も使用頻度が低く、最も目立たない黒色トナーのリサイクルが可能となる。

【0051】

【発明の効果】本発明によれば、中間転写体上の黒色トナーが他の色の像担持体に付着することが防止され、最も目立たない黒色トナーが他の色の像担持体に付着することが防止され、最も使用頻度が低く、最も目立たない黒色トナーのリサイクルが可能となる。

も使用頻度が高く、最も目立たない黒色トナーのリサイクルが可能となる。特にジャム時においても、中間転写体上の黒色のトナーが他の色の像担持体に付着することが防止され、最も使用頻度が高く、最も目立たない黒色トナーのリサイクルが可能となる。

【図面の簡単な説明】

【図1】本発明にかかるカラー画像形成装置の一実施形態を示す断面構成図である。

【図2】本発明にかかるカラー画像形成装置におけるトナー像形成状態を示す図である。

【図3】中間転写体の離間と定着手段及び転写材案内手段の移動とを示す図である。

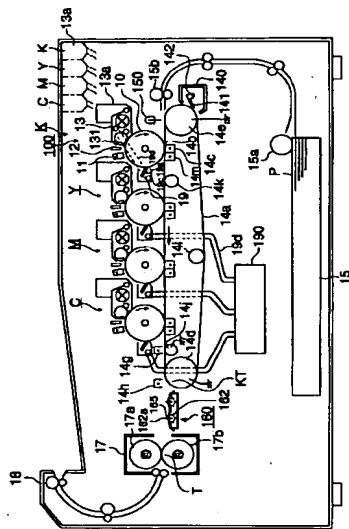
【図4】転写材案内手段の移動の他の例を示す図である。

【符号の説明】

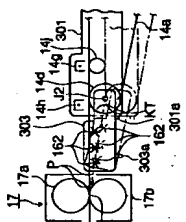
10 感光体ドラム

- 11 スコロトン帯電器
- 12 露光光学系
- 13 現像器
- 14a 中間転写ベルト
- 14c 転写器
- 14d 駆動ローラ
- 14g 裏面転写器
- 14h 紙分離AC除電器
- 14k ベルト駆動回転軸ローラ
- 10 17 定着装置
- 19 クリーニング装置
- 100 画像形成ユニット
- 162 拍車
- 190 トナー回収器
- 301, 302, 303 支持板
- P 配線紙

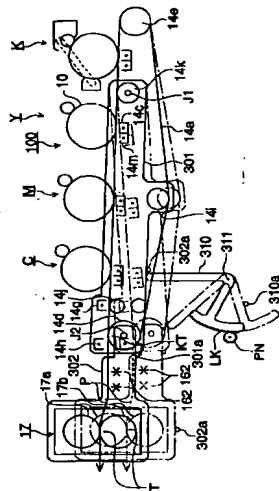
【図4】



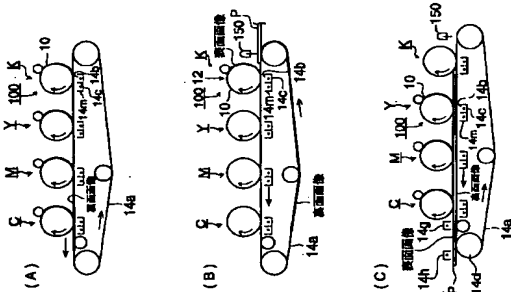
【図1】



【図3】



【図2】



フロントページの続き

Fターム(参考) 2H028 BA05 BA16  
 2H030 AA06 AA07 AB02 AD03 AD04  
 AD05 BE23 BE33 BE42 BE44  
 BE46 BE53 BE63  
 2H034 AA02 BF01 BF07 CA00 CB00  
 2H077 AA37 BA10 DB14 DB15 DB16  
 DB25 EA24 GA13